Minutes of spin meeting 05/30/07

Fanglei showed her mathcad calculation on polarization loss due to horizontal resonances. With the 14% cold snake and 5.9% warm snake, the gain of polarization due to pushing horizontal tune higehr than 8.95 after $G\gamma = 27$ is about 4.5%. Put all polarization loss together,, there are polarization losses due to horizontal resonances in the early part of the ramp 2%, injection mismatch of 2.5%; weak intrinsic resonances around $G\gamma = 5$ as 7.5%; coupling resonances at 0+ and 36+ 1-2% each. We have total loss of 14.5-16.5%. There is also a few percents loss around 0+, as the vertical tune there was not high enough. The observed loss from linac to AGS extraction is about 25%. In addition, the measured polarization difference with the high horizontal tune and low horizontal tune differed by 15% instead of the 4.5% from simulation. Thomas questioned if there is possibility that the polarization loss due to horizontal resonances are bigger than what simulation shows. We would like to retake the polarization measurement withhigh and low horizontal tunes, with the horizontal tune unchanged in the last one $G\gamma$ unit. Then the effect of flattop setup on polairzation difference between the two settings will be ruled out. Although the polairzation loss is likely smaller in this case, we are looking for a 15% (or slightly less) difference, which is measurable. Fanglei's data taking last night show that the large sine 9th harmonic bumps (-18mm) changed both vertical and horizontal tunes by 0.015-0.02 unit. Although this can still provide timing of 36+ resonance, a cleaner experiment would be to scan tunemeter kicker timing and measure polarization (effect from increase emittance), as suggested by Mei. In next a few days AGS proton operation, the focus is to see if we can get a clear picture of where and how much polarization loss are.

Haixin